



IMPROVING TIME TO MARKET

LM e-LOAD

[lmwindpower.com](http://lmwindpower.com)

**LM** WIND  
POWER

A close-up, high-angle shot of an hourglass. The top bulb is filled with fine, light-colored sand. A stream of sand is falling from the narrow neck into the bottom bulb, which is also filled with sand. The lighting is dramatic, highlighting the texture of the sand and the glass of the hourglass.

# Reduce time to market with the LM e-Load

In cooperation with GL Garrad Hassan, LM Wind Power has developed an online web service enabling **Bladed 4.1** to retrieve LM Wind Power blade data and in a single operation transform results of load calculations for on-demand assessment of loads by LM Wind Power.

### **Faster time to market - and more efficient**

The LM e-Load contributes to significantly reducing time to market for wind turbine projects as results of load calculations are now delivered in a universally compatible data format that is processed on-line and instantly shared between approved project owners.

New data formats for exchange between Bladed 4.1 and LM Wind Power have been designed to eliminate time consuming setup and data formatting work. This means that no engineering hours are wasted doing data formatting and any potential risk of misinterpretations is minimized as well.

LM Wind Power's customers save valuable engineering hours and LM Wind Power can return valuable input much faster and inform whether a given blade can handle the calculated turbine loads.

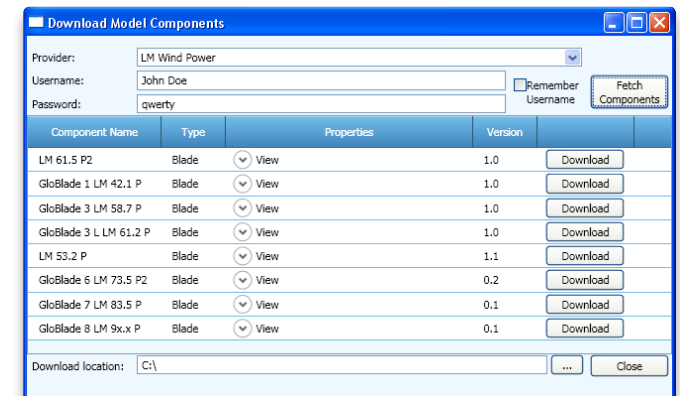
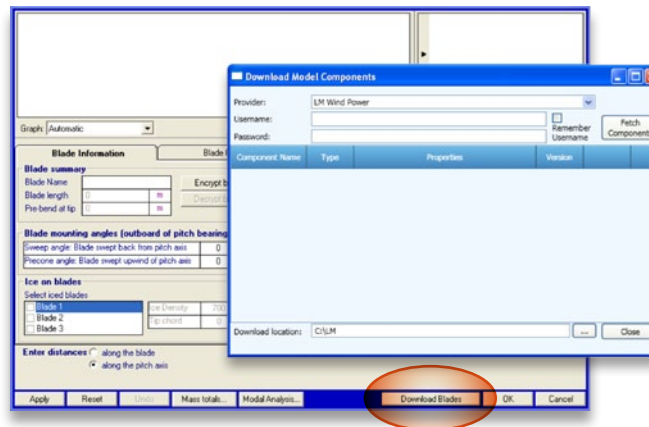
### **No time constraints - On demand at your convenience**

The use of online services, structured markup data formats for loads and automated comparison with LM Wind Power blade design load envelope, means that load assessments can be provided on demand with unprecedented responsiveness.

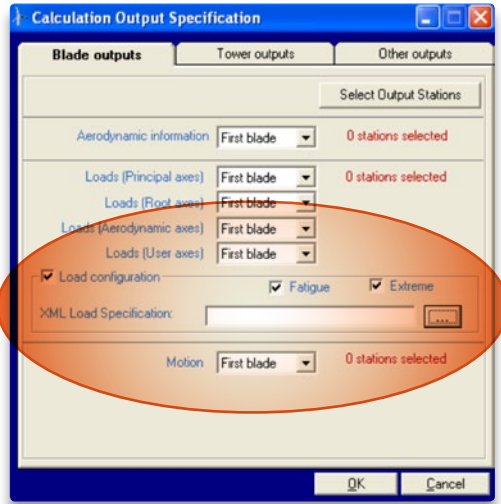
### **Access the industry's biggest blade data catalogue**

We can give you direct and instant access to the largest blade product portfolio in the whole wind industry. Approach us to obtain all the required information to carry out load calculations in Bladed 4.1 according to LM Wind Power's specifications.

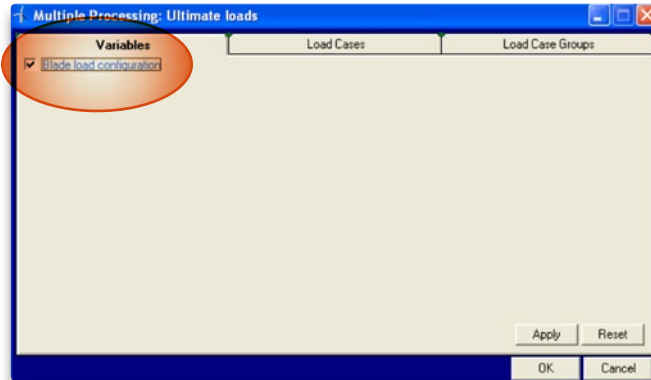
# Using the LM e-Load



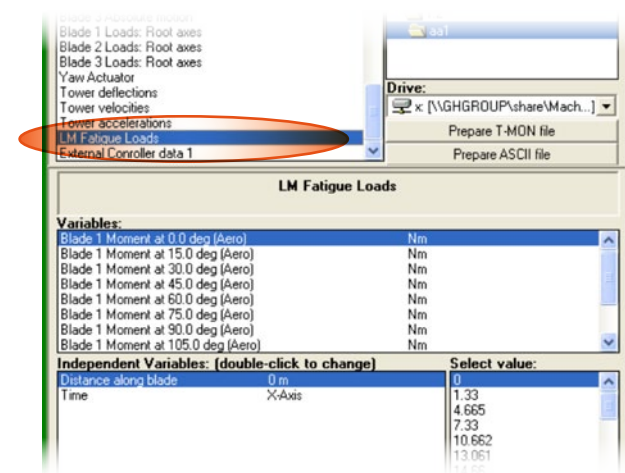
1. As a user of the LM e-Load you require an account with the LM Wind Power web service. Simply by providing your “company code”, found at the bottom of the “About” screen, your LM Wind Power Technical account manager will create your company account including username and password. This company code is used to authenticate your account every time you log on to the LM Wind Power web service.
2. From the Tools menu or by clicking on “Download blades” bring up the “Download Model Components” screen. Select “LM Wind Power” as the provider and enter your username and password given to you by LM Wind Power. Select a download location.
3. By clicking “Fetch Components” a list of blades are now displayed. View the details and download the one that is of interest. Two files will appear: a **bladed project file** containing the blade data, e.g. mass and stiffness distribution and a **load configuration file** which contains directions on how loads must be calculated for blades, e.g. cross sections, load directions and sweep angles.
4. Import the blade project file (.prj) into your project using the “Import” option from the “File” menu.



5. To open the calculation output screen, click on Power Production Loading. On the “Outputs” screen, select the “Load configuration” option and browse to the load configuration file downloaded with the blade. This file is typically called “blade name” + “load configuration” + “.xml”, e.g. “LM 61.5 P2\_Load configuration.xml”. For extreme load calculations, select the “Extreme” checkbox and for fatigue load calculations, select the “Fatigue” checkbox. After importing this file, Bladed will be setup to deliver results of load calculations according to LM Wind Power requirements.



6a. For Extreme post processing: when the simulations have been carried out, set up the extreme load processing by checking the “Blade load configuration” checkbox on the “Variables” tab. Build up the list of load cases as usual. When the calculation is finished it will produce a single .xml output file (labelled.blc).



6b. For Fatigue post processing: to set up fatigue load processing, carry out a rainflow count and damage equivalent load calculation as usual using the new “LM fatigue loads” output which you will find with the standard Bladed outputs.

7. Launch the “LM loads uploader” from the Tools menu. The form must be completed with data that identifies the project being worked on. This guides LM e-Load to make on demand assessment of calculated loads relative to the LM blade used in the turbine model.

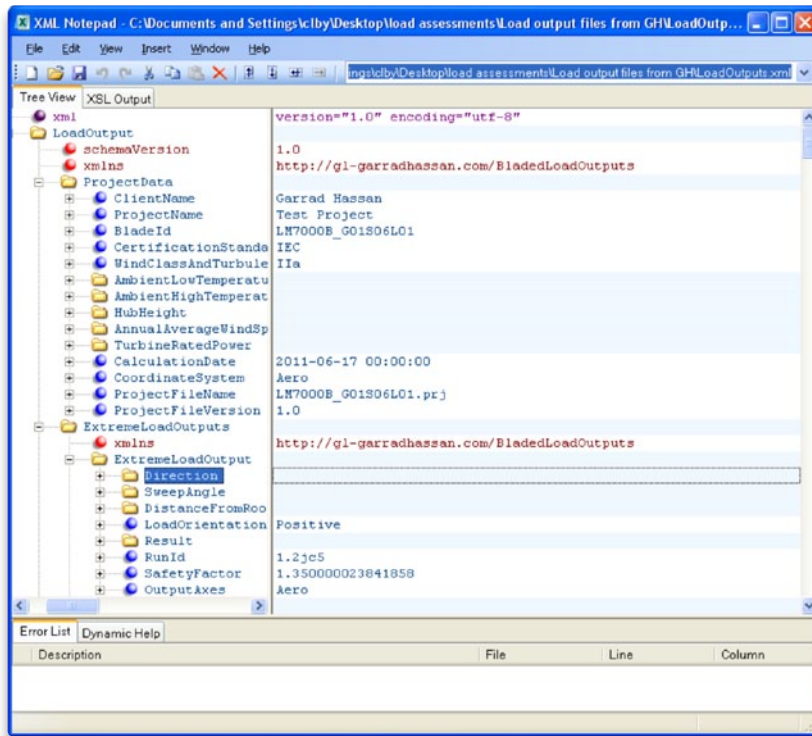
Fill in the required fields:

- **Client Name** The name identifying your company
- **Project Name** The name identifying the wind turbine project.
- **Blade ID** The name of the LM blade as it appears in the download model component list
- **Revision** The revision of the LM blade model file as it appears in the download model component list

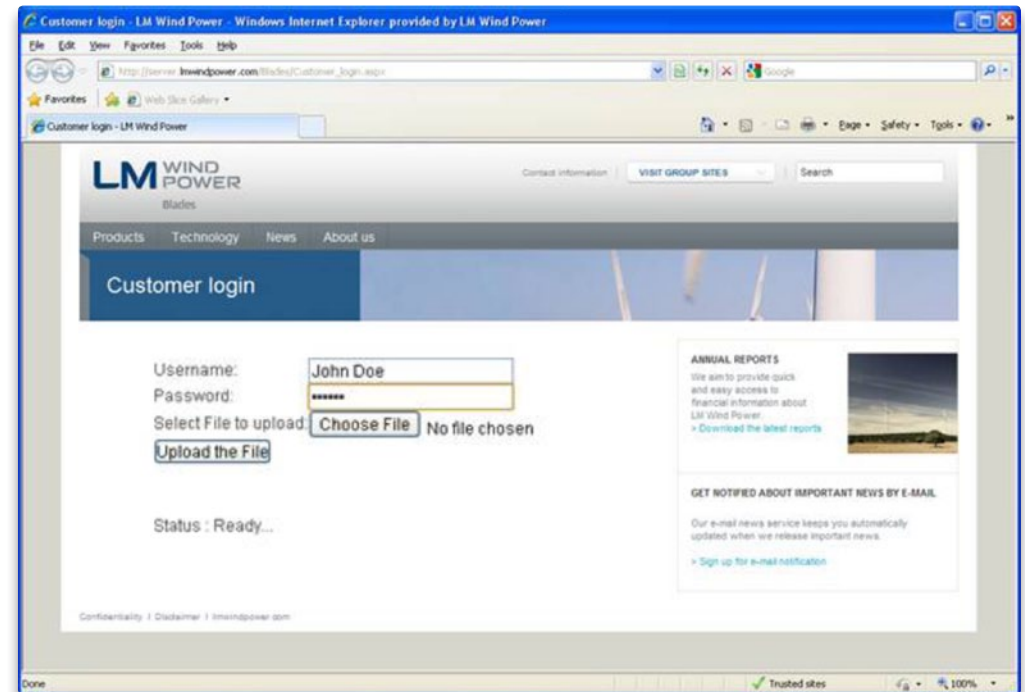
The Blade ID and Revision names are a part of the .prj file and are named e.g. LM 61.5 P2\_B 41\_Rev 1.0.prj. In this example the file name indicates that it is a model for blade id “LM 61.5 P2”, made for Bladed 4.1 as revision 1.0.

The “extreme load file” is labelled as a .blc file, which is produced when the ultimate loads calculation is carried out. Browse to find the blade model file that was downloaded using the download model component. Click on “Select rainflow output” to add all the relevant rainflow calculations. Click on “Save To File” to save as a single results file that can be uploaded to the LM web service.





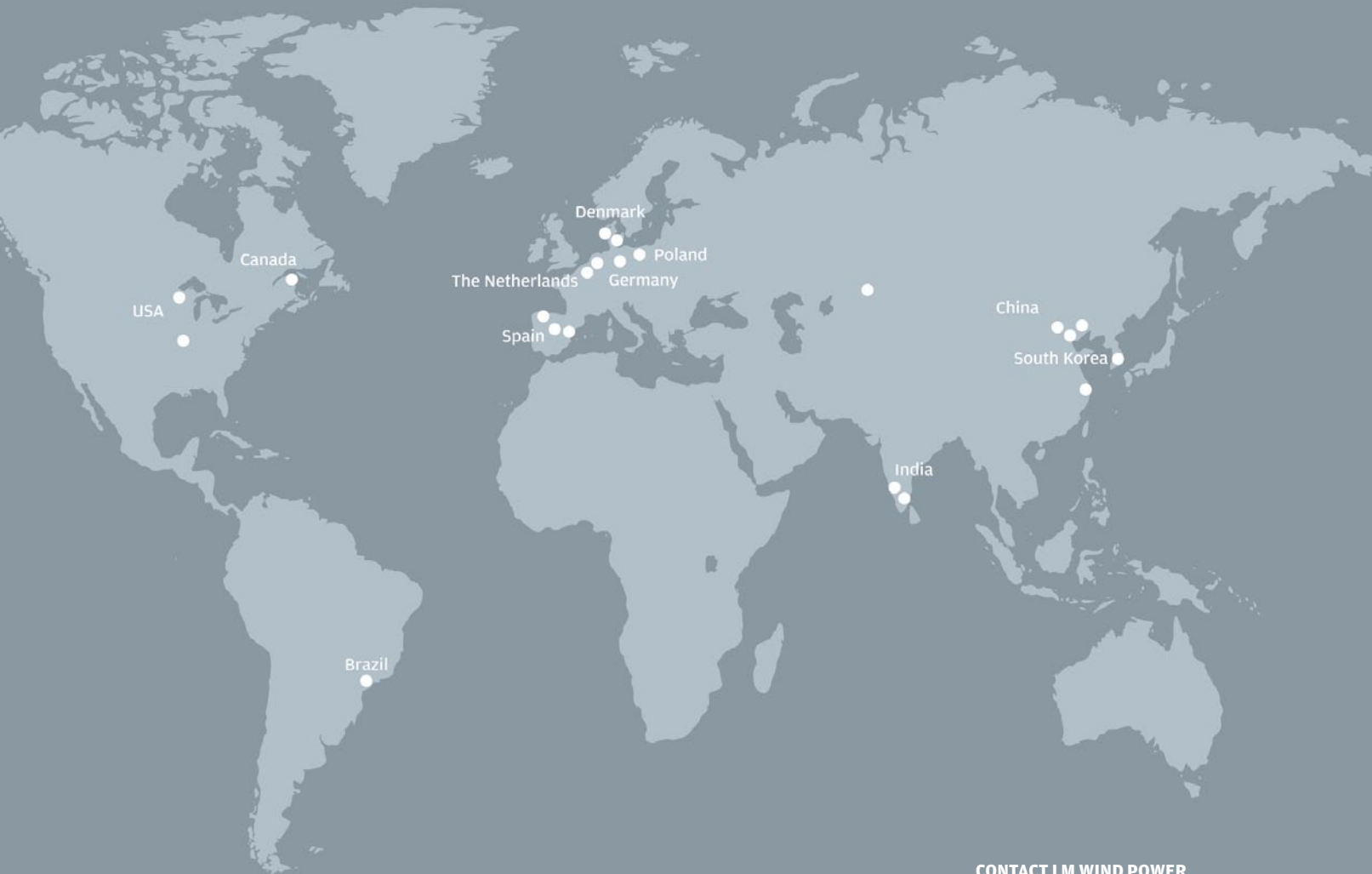
8. The final file is in an .xml format agreed between GL Garrad Hassan and LM Wind Power. The use of .xml file means that the content of the file can be inspected by standard tools like Excel. Or, you can use tools like “XML Notepad” to open the file if you want to read or edit the content of the file. You can download “XML Notepad” for free on Microsoft download sites. This file format greatly simplifies the comparison of loads against LM Wind Power’s design load envelope, resulting in faster response time for load assessments.



9. Upload the LoadOutputs.xml file produced by Bladed to the LM web service from the web page on <http://www.lmwindpower.com/Blades/e-Load.aspx> by using the login details given to you by LM Wind Power. The upload of the load outputs file on the web page will automatically kick off the on-demand assessment of the load data.

Check out our video to see how to use Bladed 4.1 to download LM blade model components to make results of load calculations fit with the file format required by the LM e-Load service on this page <http://www.lmwindpower.com/Blades/e-Load.aspx>.

Should anything fail in the upload, you can zip the LoadOutputs.xml file, and send it to [e-load@lmwindpower.com](mailto:e-load@lmwindpower.com)



## The Power to Deliver

LM Wind Power is the world's leading manufacturer of wind turbine blades. We have a global footprint and are a valued partner in established and emerging markets all over the world.

We work closely with our customers to reduce the cost of energy and continue to invest in research and development. In addition to our own wind tunnel, we now have a new technology center to ensure that your turbines continue to generate ever more power.

LM Wind Power represents the state-of-the-art in blade technology. To further support our customer base we have also sharpened our focus on service and logistics. In more than 30 years we have produced over 140,000 blades from 5 to 61.5 meters and continue to establish our position among the world leaders in the growing wind power industry.

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